

What is claimed is:

1. A fuel cell comprising:

cell assemblies each having a plurality of unit cells
each having a membrane electrode assembly of an anode, a
cathode, and a solid polymer electrolyte membrane,
interposed between said anode and said cathode, said cell
assemblies having reactant gas passages and coolant passages
defined at least partly therein and connected in series with
each other across said unit cells for supplying and/or
circulating reactant gases and a coolant to said cell
assemblies;

a fuel gas outlet/inlet passage extending between the
unit cells and connecting with fuel gas passages, of said
reactant gas passages, for passing a fuel gas therethrough;
and

a fuel gas adjusting mechanism connected to said fuel
gas outlet/inlet passage for controlling the flow rate and
direction of said fuel gas.

2. A fuel cell according to claim 1, further
comprising:

an oxygen-containing gas outlet/inlet passage extending
between the unit cells and connecting with oxygen-containing
gas passages, of said reactant gas passages, for passing an
oxygen-containing gas therethrough; and

an oxygen-containing gas adjusting mechanism connected

to said oxygen-containing gas outlet/inlet passage for controlling the flow rate and direction of said oxygen-containing gas.

5 3. A fuel cell according to claim 2, further comprising:

 a coolant outlet/inlet passage extending between the unit cells and connecting with said coolant passages, for passing a coolant therethrough; and

10 a coolant adjusting mechanism connected to said coolant outlet/inlet passage for controlling the flow rate and direction of said coolant.

 4. A fuel cell according to claim 1, further comprising:

15 a coolant outlet/inlet passage extending between the unit cells and connecting with said coolant passages, for passing a coolant therethrough; and

 a coolant adjusting mechanism connected to said coolant
20 outlet/inlet passage for controlling the flow rate and direction of said coolant.

 5. A fuel cell according to claim 1, wherein at least two of said unit cells of said cell assemblies are
25 juxtaposed.

 6. A method of controlling a fuel cell including cell

assemblies each having a plurality of unit cells each having a membrane electrode assembly of an anode, a cathode, and a solid polymer electrolyte membrane, interposed between said anode and said cathode, said cell assemblies having reactant gas passages and coolant passages defined at least partly therein and connected in series with each other across said unit cells for supplying and/or circulating reactant gases and a coolant to said cell assemblies, said method comprising the step of:

controlling a fuel gas flowing through fuel gas passages, of said reactant gas passages, with a fuel gas adjusting mechanism for thereby adjusting the temperatures and relative humidities of said cell assemblies.

7. A method according to claim 6, further comprising the step of:

controlling an oxygen-containing gas flowing through oxygen-containing gas passages, of said reactant gas passages, with an oxygen-containing gas adjusting mechanism for thereby adjusting the temperatures and relative humidities of said cell assemblies.

8. A method according to claim 6, further comprising the step of:

controlling a coolant supplied to and/or discharged from a coolant outlet/inlet passage extending between the unit cells and connecting with said coolant passages, with a

coolant adjusting mechanism for thereby adjusting the
temperatures and relative humidities of said cell
assemblies.

5 9. A method according to claim 7, further comprising
the step of:

 controlling a coolant supplied to and/or discharged
from a coolant outlet/inlet passage extending between the
unit cells and connecting with said coolant passages, with a
10 coolant adjusting mechanism for thereby adjusting the
temperatures and relative humidities of said cell
assemblies.

 10. A method according to claim 9, further comprising
15 the step of:

 controlling said reactant gases and said coolant to
operate unit cells into which said coolant is initially
introduced at the time of a startup of said cell assemblies.